

# 2010 Research Centers



*South Dakota*  
Research & Commercialization



DEPARTMENT OF TOURISM *and* STATE DEVELOPMENT

# Oversight of 2010 Research Centers

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## 2010 Research Center Funding Explanation



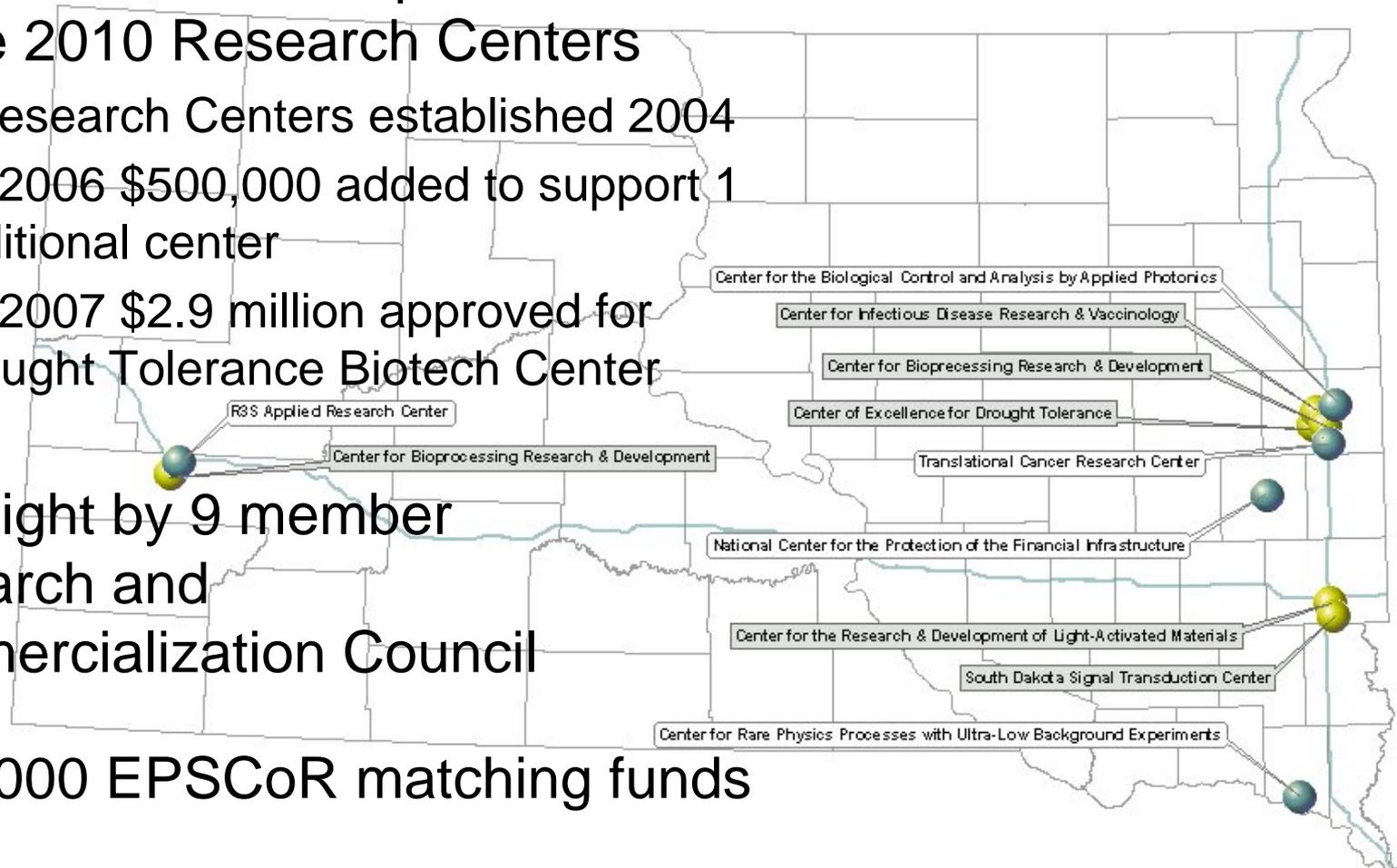
# South Dakota Research & Commercialization Investments

□ FY 2004 \$2.7 million provided to create 2010 Research Centers

- 4 Research Centers established 2004
- FY 2006 \$500,000 added to support 1 additional center
- FY 2007 \$2.9 million approved for Drought Tolerance Biotech Center

□ Oversight by 9 member Research and Commercialization Council

□ \$600,000 EPSCoR matching funds



# Research Commercialization

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"The vision to require that the 2010 Centers drive toward sustainability, build collaborations among universities and the private sector, increase competitiveness for federal funding programs, support academic programs with a focus on graduate training, and drive economic development, created a challenging framework. If successful within such a framework the 2010 Centers would truly have a positive impact on the state. We report that with few exceptions, the Centers have been successful and have had a positive impact on the state."

(Report of the AAAS Research Competitiveness Program Review Team, December 2007)



# 2010 Research Centers

## Center for Accelerated Applications at the Nanoscale

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### ❑ Collaboration

- South Dakota School of Mines and Technology
- South Dakota State University

❑ FY 2004 - \$580,000 annually for 4 years

❑ \$1.3 million in external funding

❑ Research and Commercialization Council did not fund in year five



Nano Center Research equipment



# South Dakota Research & Commercialization Investments

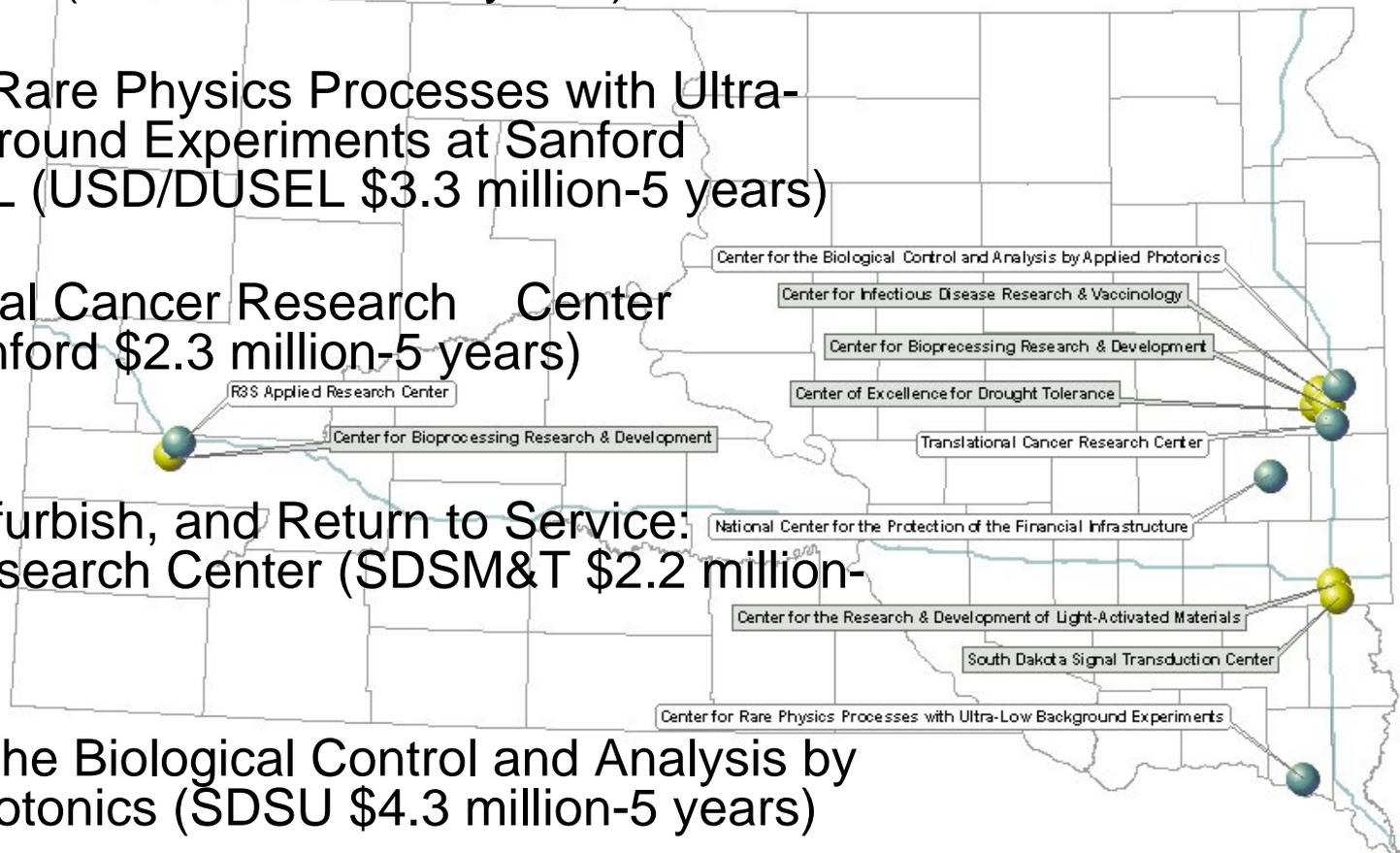
- ❑ National Center for the Protection of the Financial Infrastructure (DSU \$2 million-5 years)

- ❑ Center for Rare Physics Processes with Ultra-Low Background Experiments at Sanford Lab/DUSEL (USD/DUSEL \$3.3 million-5 years)

- ❑ Translational Cancer Research Center (SDSU/Sanford \$2.3 million-5 years)

- ❑ Repair, Refurbish, and Return to Service: Applied Research Center (SDSM&T \$2.2 million-5 years)

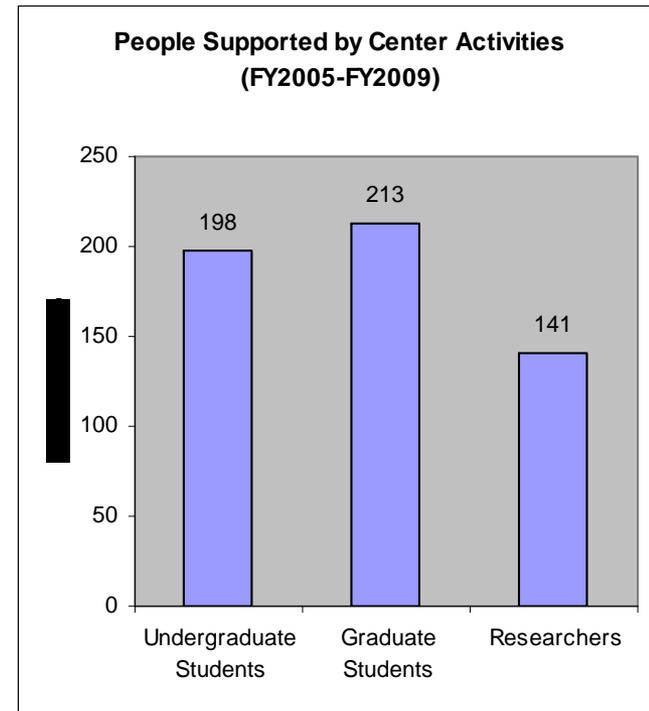
- ❑ Center for the Biological Control and Analysis by Applied Photonics (SDSU \$4.3 million-5 years)



# Impact of 2010 Research Center Investments

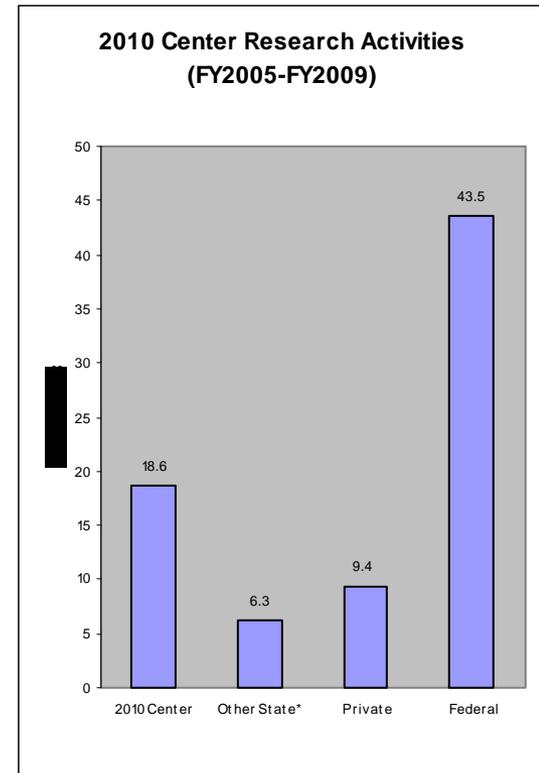
Six 2010 Research Centers have provided 552 jobs since 2005

- 198 Undergraduates
- 213 Graduate Students
- 141 Researchers



# Impact of 2010 Research Center Investments

- South Dakota has invested \$18.6 million in six 2010 Research Centers
- This investment brought in an additional \$59.2 million in other state, private and federal revenue
- A conservative Economic Impact Model yields \$111 million in economic impact to the State of South Dakota



# Overview of Innovation Commercialization & 2010 Initiative

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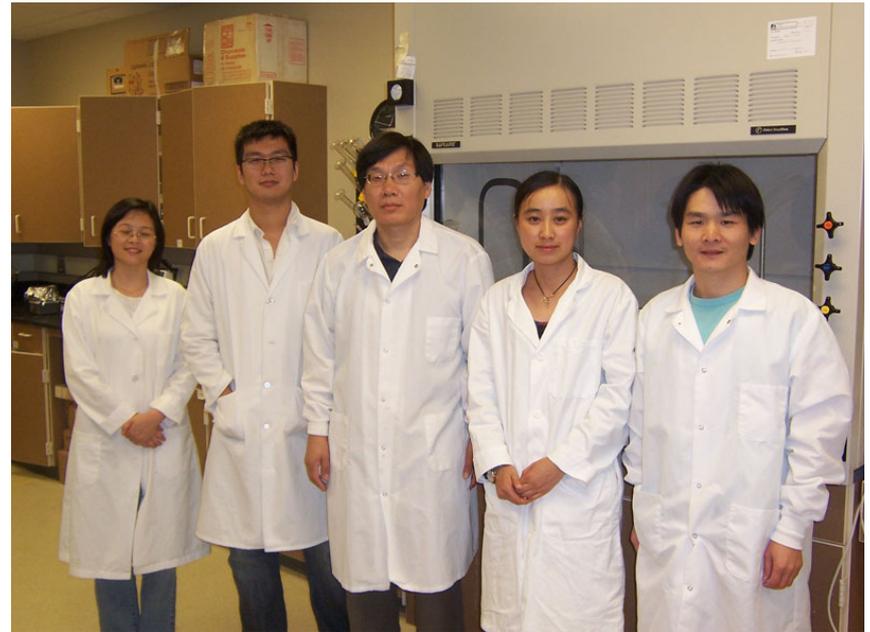


# South Dakota Discovery Research Investments

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## □ Discovery Research

- 9 New PhD programs (BOR)
  - \$5.28 million funding provided annually
- SEED grants
  - \$500,000 annually
- YuYu Sun, Biomedical Engineering faculty member brought NIH funding & research to South Dakota



YuYu Sun & Research team

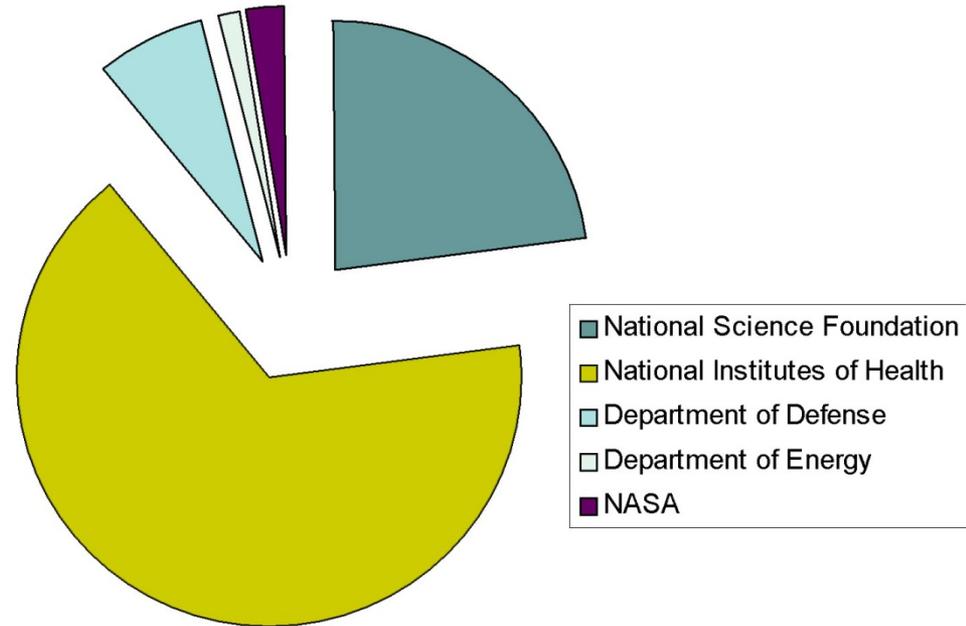


# EPSCoR Programs

## Support Research Infrastructure

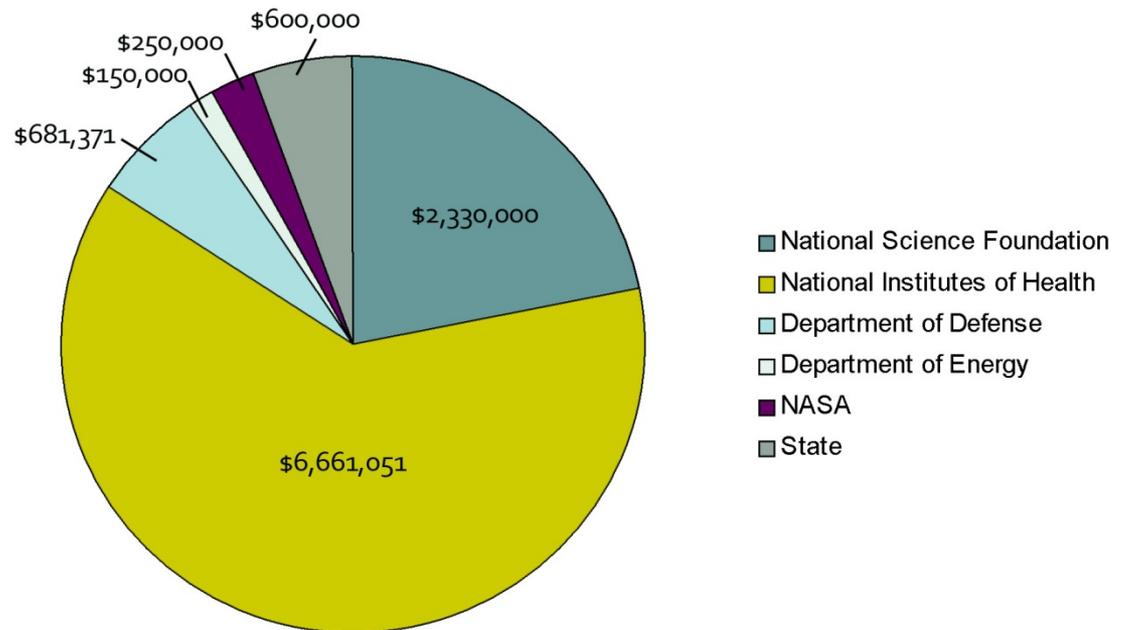
### Supports Research Infrastructure Development

- Equipment
- Education & Outreach
- Economic Development



# SD EPSCoR Programs

- ❑ \$600,000 match
- ❑ SD REACH Committee oversees EPSCoR programs
- ❑ Funding from six federal agencies
  - Fund research infrastructure
  - Research projects (competition with EPSCoR states)



# SD EPSCoR Research: NSF Photo Activate Nanoscale Systems

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## □ NSF EPSCoR RII

- 2006-2009 \$6.75 million project
  - Equipment
  - Young researchers
  - Graduate students
  - Undergraduate students
  - Materials & supplies
- 2009-2014 \$30 million Proposal Pending
  - \$20 million NSF funds
  - \$10 million match required
    - State
    - Private
    - Universities



PANS Research Team



# 2010 Research Center Economic Development: Recruitment

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## □ Radiance Technologies Inc.

- Electronic manufacturing facility in Mission-20 employees
- DoD alternative energy/solar energy R&D--\$7.2 million SDSU-Brookings
- Research Collaboration with SDSM&T



Radiance Facility Ribbon Cutting



# 2010 Research Center Economic Development: Entrepreneurs

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Giant Vision Winner 2006



PhotoBioMed, Inc. Employees 2008



# 2010 Research Center Economic Development: Expansion

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## □ Research & Development Assistants & Interns

- SBS has involved 8 DSU students (MSIA, MSIS and DSc) through this assistantship process and hired 3 full-time.

“This program is a real success story in that it actually works. DSU gets students recruited into our programs, the students get real experience in their field of choice, the state gets economic development and jobs in SD, and the business benefits because these are affordable resources.” Jeff Hasse, SBS



Secure Bank Systems



# 2010 Research Centers

## South Dakota Signal Transduction Center

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### ❑ Collaboration

- USD School of Medicine
- Sanford Research

❑ 2010 provided \$900,000/yr from 2005-09

❑ \$23 million in external funding

❑ 70 jobs created with \$4.2 million FY08 payroll

### ❑ Business Expansions

- Burnham Institute (expansion to SD)
- Sanford Project & Research Park

### ❑ Future plans

- Continued growth in research and employment opportunities



Signal Transduction Center Research Team



# 2010 Research Centers

## South Dakota Signal Transduction Center

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### Major accomplishments of STC 2010

- ❑ Spawned new research centers including cancer and metabolism
- ❑ Funding highlights: renewal of \$10M NIH CV COBRE and competitive score for Cancer Center COBRE
- ❑ Research highlight: Studies on low thyroid function and heart disease resulted in 4 papers forwarded to NIH Director to consider including in Congressional Report.
- ❑ New studies on treating low thyroid condition resulting from myocardial infarction in rats are remarkable and could lead to dramatic improvement in patients and massive saving in global health costs.



# 2010 Research Centers

## Center for Infectious Disease Research and Vaccinology

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- ❑ Collaboration
  - SDSU
  - USD School of Medicine
- ❑ FY 2004 - \$780,000 annually
- ❑ \$7.9 million external funding
- ❑ \$1.8 million in SBIR Grants
- ❑ Business spin off & expansion
  - Chronix Biomedical (recruited)
  - Brookings Biomedical Inc (start up)
  - Rural Technologies Inc. (SD expansion)
- ❑ Future plans:
  - 3 tenure track faculty
  - Vaccine industry partners
  - International collaborations

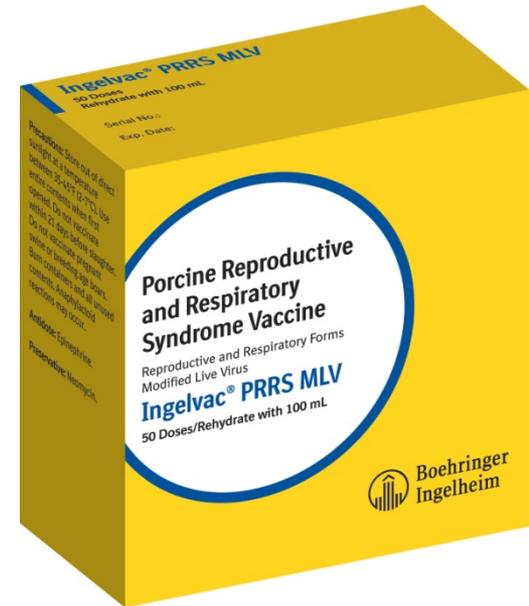


SDSU student in Chronix Laboratory

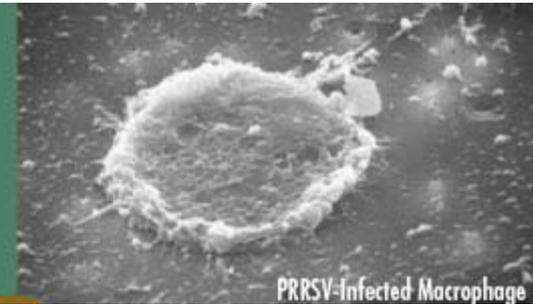


# Economic Benefits to South Dakota of One Infectious Disease Research Project: PRRSV

- ❑ Grants, ~\$500K/year
- ❑ Diagnostic services ~\$2M/year
- ❑ Royalties
  - Vaccine: ~\$500K/year
  - Commercial test kit ~\$80K/year
- ❑ Monoclonal antibodies
  - RTI Inc, Brookings



Detection of Porcine Reproductive and Respiratory Syndrome Virus with  
**Tetracore's PRRSV Real-Time RT-PCR Reagents**  
Multiplex reagents detect both North American and Euro PRRSV ~ in a single reaction!



# 2010 Research Centers

## Center for the research and Development of Light-Activated Materials

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### ❑ Collaboration

- University of South Dakota
- South Dakota State University
- Avera Research Institute

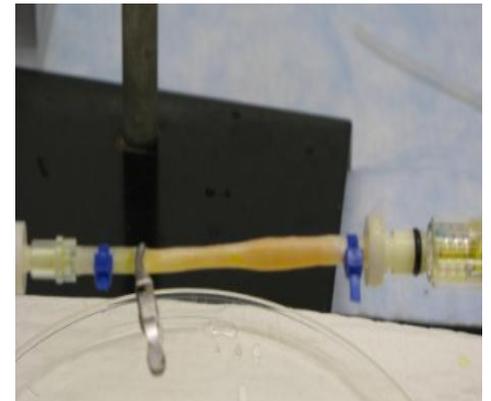
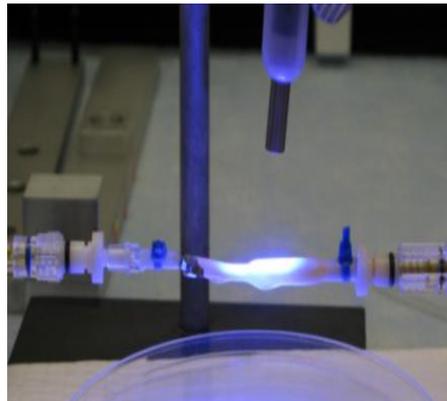
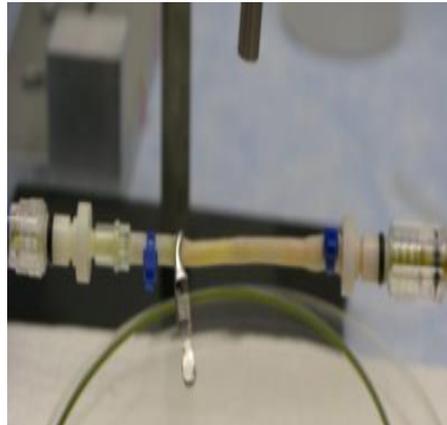
### ❑ FY 2004 - \$503,741 annually

### ❑ \$5.3 million external funding

### ❑ Three spin off companies

- PhotoBioMed
- Tetherx
- Prairie Scientific Innovations

### ❑ Future Plans



# 2010 Research Centers

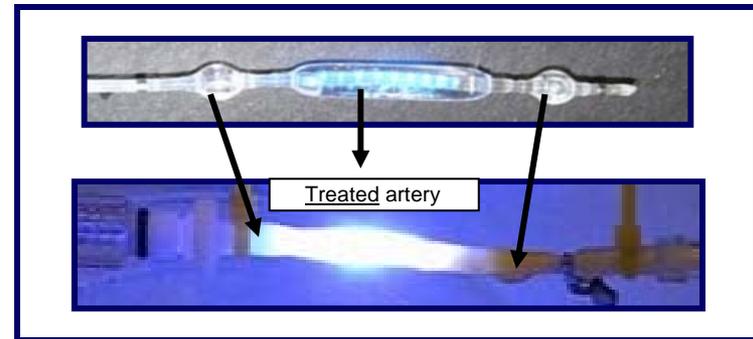
## Center for the research and Development of Light-Activated Materials

### PhotoBioMed

- Partnered to create Tetherx
- Treat peripheral vascular disease
- Recently demonstrated proof of concept
- Upcoming long term in vivo study
- 2010 human clinical trial
- 2011 product in market

Tether<sub>Rx</sub> Inc.

### The Blue Lumen™ Medical Device

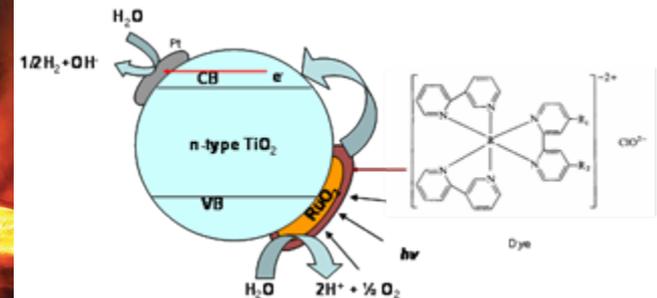


### Biomedical Engineering

- Antimicrobial plastics
- Regenerative medicine

### Materials Chemistry

- Solar energy



# 2010 Research Centers

- Center for Bioprocessing Research and Development
  - Collaboration
    - South Dakota School of Mines & Technology
    - South Dakota State University
  - FY 2007 - \$500,000 annually
  - \$5.3 million in federal funding
  - \$1.1 million in industry funding
  - Future sustainability plans:
    - University faculty positions
    - Congressional interest
    - NSF Industry/Univ Collaborative Res. Center
    - 6+ Universities, 30+ companies
    - \$1+ million annual funding



Ethanol Plant



# 2010 Research Centers

## Center for Bioprocessing Research and Development

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### Major Accomplishments

#### □ Business development

- Separation Kinetics (recruit)
- KL Energy, Inc (expansion)
- Zymetis (recruit)
- ICM, Inc (expansion)

#### □ Research partnerships

- Federal labs: NCAUR, ANL, NREL
- Universities: MSU, UM, UW, NCSU, NDSU
- International: South Africa, Denmark

#### □ New research expertise hired

- CBRD Director (Lew Christopher): 20 years bioprocessing exp., over 50 peer-reviewed papers, 110 presentations, 7 patents



# Key Ingredients: R&D Infrastructure 2010 Research Centers

## Center of Excellence for Drought Tolerance

- ❑ South Dakota State University
- ❑ 2008 - \$2.9 million state funds over three years
- ❑ South Dakota Seed Industry Partner
- ❑ \$6.2 million Seed Technology Center
- ❑ \$600,000 annually supporting research
- ❑ External Funds
  - \$4.9 million federal FY 2008
  - \$2.8 million private
- ❑ Future plans
  - Funding: experiment station and commodity groups, industry, and federal grants

Seed Technology Building



# 2010 Research Centers Drought Tolerance Center

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- New facilities and faculty members are creating an environment that is increasing South Dakota's agricultural production.
  - Speed up the delivery of new genetics and management practices that will increase yields in water limited environments.
    - A drought tolerant corn hybrid that produces a 5 bu/acre yield increase that is planted on 2 million acres will increase SD wealth by 35 million dollars.
  - Provide an environment of excellence
    - Monsanto funding for Ph.D. fellowships in wheat breeding

